

Amendments to the Claims

This listing of claims will replace all prior versions, and listings of claims in the above-referenced application.

Listing of Claims

1. **(Currently Amended)** A fuse assembly comprising:
a fuse element prepared in a substantially non-linear form, the fuse element
 comprising at least two terminals, the at least two terminals comprising a first
 terminal and a second terminal;
at least two conductive endcaps being coupled to the first terminal and the second
 terminal; and
a fuse body comprising a dielectric material adapted to substantially enclose the
 fuse element between the at least two endcaps, wherein
 at least a portion of the dielectric material is positioned between an area
 bounded by said fuse element in a substantially non-linear form and a
 line connecting two ends of the fuse element to impede arcing across
 the fuse element, and
 the fuse element is separated from said portion of the dielectric material by a
 space along a length of said fuse element.
2. **(Original)** The fuse assembly of claim 1, wherein the non-linear form of the
fuse element is substantially a curve.
3. **(Previously Presented)** The fuse assembly of claim 1, wherein the fuse
element is capable of experiencing arcing as a result of an opening
 being created in at least a portion of the fuse element,
the opening having two ends, the dielectric material forces arcing between the two
 ends of the opening to traverse a path consistent with the non-linear form.

4. **(Original)** The fuse assembly of claim 3, wherein the at least portion of the dielectric material comprises a superior dielectric material.
5. **(Original)** The fuse assembly of claim 3, wherein the path is consistent with a shape of the at least portion of dielectric material.
6. **(Original)** The fuse assembly of claim 3, wherein the arcing causes formation of a conductive path along a surface of the at least portion of the dielectric material.
7. **(Original)** The fuse assembly of claim 6, wherein the conductive path is comprised of carbon.
8. **(Original)** The fuse assembly of claim 6, wherein the conductive path reduces an insulating value of the dielectric material.
9. **(Original)** The fuse assembly of claim 1, wherein at least a portion of the dielectric material is positioned between an area bounded by the prepared fuse element and a line connecting the at least two endcaps.
10. **(Original)** The fuse assembly of claim 9, wherein the at least portion of the dielectric material is positioned to impede arcing between the at least two endcaps.
11. **(Original)** The fuse assembly of claim 9, wherein the at least portion of the dielectric material comprises a superior dielectric material.
12. **(Previously Presented)** The fuse assembly of claim 3, wherein forcing the arcing between the two ends of the opening to traverse the path introduces an increased amount of dielectric separation.
13. **(Original)** The fuse assembly of claim 12, wherein the increased amount of dielectric separation is caused by an introduction of at least a portion of the dielectric material within a perimeter of the path.

14. **(Original)** The fuse assembly of claim 12, wherein the path traversed is substantially a curve and forcing the arcing to follow the path along the curve introduces the increased amount of dielectric separation.

15. **(Previously Presented)** The fuse assembly of claim 3, wherein the opening is caused by passing an excessive current through the fuse element, the excessive current causing a meltdown of at least a portion of the fuse element.

16. **(Original)** The fuse assembly of claim 15, wherein the meltdown causes formation of two ends of the at least the portion of the fuse element.

17. **(Previously Presented)** The fuse assembly of claim 3, wherein creating the opening in the fuse element causes an arc, the arc being formed between the two ends.

18. **(Previously Presented)** A method of reducing footprint of a fuse element, the method comprising:

preparing the fuse element in a substantially non-linear form, the fuse element comprising at least two terminals, the at least two terminals comprising a first terminal and a second terminal, the footprint being reduced by adjusting distance between the first terminal and the second terminal;
coupling the fuse element between at least two conductive endcaps coupled to the first and second terminals;
enclosing the fuse element in a dielectric material, wherein at least a portion of said dielectric material is positioned between an area bounded by said fuse element in a substantially non-linear form and a line connecting two ends of the fuse element, and said fuse element is separated from said portion of said dielectric material by a space along a length of said fuse element.

19. **(Original)** The method of claim 18, wherein the non-linear form of the fuse element is substantially a curve.

20. **(Cancelled).**
21. **(Previously Presented)** The method of claim 18, wherein the at least portion of the dielectric material comprises a superior dielectric material.
22. **(Previously Presented)** The method of claim 18, wherein the substantially non-linear form is consistent with a shape of the at least portion of dielectric material.
23. **(Previously Presented)** The method of claim 18, wherein the fuse element is capable of experiencing arcing as a result of an opening being created in at least a portion of the fuse element, the opening having two ends, the dielectric material forces arcing between the two ends of the opening to traverse a path consistent with the non-linear form.
24. **(Previously Presented)** The method of claim 23, wherein the arcing causes formation of a conductive path along a surface of at least portion of the dielectric material, the at least a portion of the dielectric material is positioned between an area bounded by the prepared fuse element and a line connecting two ends of the fuse element.
25. **(Original)** The method of claim 24, wherein the conductive path is comprised of carbon.
26. **(Original)** The method of claim 24, wherein the conductive path reduces an insulating value of the dielectric material.
27. **(Previously Presented)** The method of claim 24, wherein the forced arcing between the two ends of the opening to traverse the path introduces an increased amount of dielectric separation.

28. **(Original)** The method of claim 27, wherein the increased amount of dielectric separation is caused by an introduction of at least a portion of the dielectric material within a perimeter of the path.

29. **(Original)** The method of claim 23, wherein creating the opening is caused by passing an excessive current through the fuse element, the excessive current causing a meltdown of at least a portion of the fuse element.

30. **(Original)** The method of claim 29, wherein the meltdown causes formation of two ends of said at least the portion of the fuse element.

31. **(Original)** The method of claim 18 further comprising:
for a defined footprint adjusting height of the fuse element to adjust at least a portion of the dielectric material separating the at least two endcaps.

32. **(Original)** The method of claim 31, wherein said at least portion of the dielectric material separating the at least two endcaps is in a form of a plate.

33. **(Currently Amended)** A method of increasing dielectric separation between at least two terminals of a fuse element that experience arcing, the method comprising:
preparing the fuse element in a substantially non-linear form;
coupling the fuse element between at least two conductive endcaps, the at least two conductive endcaps being coupled to the corresponding at least two terminals; and
enclosing the fuse element in a dielectric material, wherein
at least a portion of the dielectric material is positioned between an area bounded by said prepared fuse element and a line connecting the at least two endcaps to impede arcing across the fuse element, and
said fuse element is separated from said portion of said dielectric material by a space along a length of said fuse element.

34. **(Original)** The method of claim 33, wherein the at least two terminals comprise a first terminal and a second terminal, the dielectric material separating the first terminal and the second terminal is in a form of a plate.
35. **(Original)** The method of claim 33, wherein the non-linear form of the fuse element is substantially a curve.
36. **(Cancelled).**
37. **(Currently Amended)** The method of claim ~~36~~33, wherein the at least portion of the dielectric material comprises a superior dielectric material.
38. **(Currently Amended)** The method of claim ~~36~~33, wherein the substantially non-linear form is consistent with a shape of the at least portion of dielectric material.
39. **(Previously Presented)** The method of claim 33, wherein the arcing causes formation of a conductive path along a surface of at least portion of the dielectric material.
40. **(Original)** The method of claim 39, wherein the conductive path is comprised of carbon.
41. **(Original)** The method of claim 39, wherein the conductive path reduces an insulating value of the dielectric material.
42. **(Previously Presented)** The method of claim 33, wherein the fuse element experiences arcing as a result of an opening being created in at least a portion of the fuse element, the opening having two ends, the dielectric material forces arcing between the two ends of the opening to traverse a path consistent with the non-linear form.

43. **(Previously Presented)** The method of claim 42, wherein the forced arcing between the two ends of the opening to traverse the path introduces an increased amount of dielectric separation.

44. **(Original)** The method of claim 43, wherein the increased amount of dielectric separation is caused by an introduction of at least a portion of the dielectric material within a perimeter of the path.

45. **(Original)** The method of claim 42, wherein the path traversed is substantially a curve and the forced arcing follows the path along the curve thereby introducing the increased amount of dielectric separation.

46. **(Original)** The method of claim 42, wherein creating the opening is caused by passing an excessive current through the fuse element, the excessive current causing a meltdown of said at least the portion of the fuse element.

47. **(Original)** The method of claim 46, wherein the meltdown causes formation of two ends of said at least the portion of the fuse element.

48. **(Previously Presented)** The method of claim 42, wherein creating the opening in said at least the portion of the fuse element causes an arc, the arc being formed between the two ends of the opening.

49. **(Previously Presented)** A fuse comprising:
a fuse element prepared in a substantially non-linear form, wherein at least a portion of the fuse element is capable of experiencing arcing as a result of excessive current flowing through the fuse element;
means for increasing a dielectric separation to impede the arcing, wherein said means for increasing said dielectric separation is separated from said fuse element by a space along a length of said fuse element.

50. **(Original)** The fuse of claim 49, wherein the fuse further comprises:
the fuse element comprising at least two terminals, the at least two terminals
 comprising a first terminal and a second terminal; and
at least two conductive endcaps, the at least two endcaps being coupled to the at
 least two terminals.
51. **(Original)** The fuse of claim 50, wherein the fuse element is enclosed by a
dielectric material, wherein the dielectric material is adapted to substantially enclose the fuse
element between the at least two endcaps.
52. **(Original)** The fuse of claim 51, wherein the means for increasing the
dielectric separation comprises positioning at least a portion of the dielectric material
between an area bounded by the prepared fuse element and a line connecting the at least
two endcaps.
53. **(Original)** The fuse of claim 51, wherein the means for increasing the
dielectric separation comprises forcing the arcing between the two endcaps to traverse a
path consistent with a form of the dielectric material between the at least two endcaps.
54. **(Original)** The fuse of claim 52, wherein the at least portion of the
dielectric material comprises a superior dielectric material.
55. **(Original)** The fuse of claim 52, wherein the arcing causes formation of a
conductive path along a surface of the at least portion of the dielectric material.
56. **(Original)** The fuse of claim 52, wherein the at least portion of the
dielectric material is positioned to impede arcing between the at least two endcaps.
57. **(Original)** The fuse of claim 55, wherein the conductive path is comprised
of carbon.

58. **(Original)** The fuse of claim 55, wherein the conductive path reduces an insulating value of the dielectric material positioned between the at least two endcaps.

59. **(Original)** The fuse of claim 49, wherein the excessive current causes a meltdown of at least a portion of the fuse element.

60. **(Original)** The fuse of claim 59, wherein the meltdown causes formation of two ends of the at least portion of the fuse element, the arcing occurring between the two ends.

61. **(Original)** The fuse of claim 60, wherein the means for increasing the dielectric separation comprises forcing the arcing between the two ends to traverse a path consistent with the non-linear form.

62. **(Original)** The fuse of claim 60, wherein the means for increasing the dielectric separation comprises positioning at least a portion of the dielectric material between an area bounded by the prepared fuse element and a line connecting the two ends.

63. **(Original)** The fuse of claim 62, wherein the at least portion of the dielectric material comprises a superior dielectric material.

64. **(Original)** The fuse of claim 62, wherein the at least portion of the dielectric material is positioned to impede arcing between the two ends.

65. **(Original)** The fuse of claim 62, wherein the arcing causes formation of a conductive path along a surface of the at least portion of the dielectric material.

66. **(Original)** The fuse of claim 65, wherein the conductive path is comprised of carbon.

67. **(Original)** The fuse of claim 65, wherein the conductive path reduces an insulating value of the dielectric material positioned between the two ends.

68. **(Original)** The fuse of claim 49, wherein the non-linear form of the fuse element is substantially a curve.

69. **(Currently Amended)** A method of impeding arcing, ~~said arcing~~ occurring across a gap formed in a fuse element ~~by said arcing~~, the method comprising: creating the gap in the fuse element, the gap being created as a result of heat generated in response to excessive current flowing through the fuse element, the fuse element being prepared in a substantially non-linear form; and forcing the arcing across the gap to traverse a path consistent with the non-linear form, wherein said fuse element is enclosed by a dielectric material, and at least a portion of said dielectric material is positioned between an area bounded by said fuse element prepared in the substantially non-linear form and a line connecting two ends of said fuse element to impede the arcing, the two ends being formed by said opening, wherein said portion of dielectric is separated from said fuse element by a space along a length of said fuse element.

70. **(Original)** The method of claim 69, wherein the non-linear form of the fuse element is substantially a curve.

71. **(Cancelled).**

72. **(Cancelled).**

73. **(Currently Amended)** The method of claim ~~71~~69, wherein the at least portion of the dielectric material comprises a superior dielectric material.

74. **(Currently Amended)** The method of claim ~~71~~69, wherein the path is consistent with a shape of the at least portion of dielectric material.

75. **(Currently Amended)** The method of claim ~~71~~69, wherein the arcing causes formation of a conductive path along a surface of the at least portion of the dielectric material.

76. **(Original)** The method of claim 75, wherein the conductive path is comprised of carbon.

77. **(Original)** The method of claim 75, wherein the conductive path reduces an insulating value of the dielectric material.

78. **(Original)** The method of claim 69, wherein the fuse element comprises at least two terminals, the at least two terminals comprising a first terminal and a second terminal.

79. **(Original)** The method of claim 78, wherein the first terminal and the second terminal are coupled to at least two conductive endcaps.

80. **(Original)** The method of claim 79, wherein at least a portion of the dielectric material is positioned between an area bounded by the prepared fuse element and a line connecting the at least two endcaps.

81. **(Original)** The method of claim 80, wherein the at least portion of the dielectric material is positioned to impede arcing between the at least two endcaps.

82. **(Original)** The method of claim 80, wherein the at least portion of the dielectric material comprises a superior dielectric material.

83. **(Original)** The method of claim 80, wherein the path is consistent with a shape of the at least portion of dielectric material.

84. **(Original)** The method of claim 80, wherein the arcing causes formation of a conductive path along a surface of the at least portion of the dielectric material.

85. **(Original)** The method of claim 84, wherein the conductive path is comprised of carbon.

86. **(Original)** The method of claim 84, wherein the conductive path reduces an insulating value of the dielectric material.

87. **(Original)** The method of claim 69, wherein forcing the arcing across the gap to traverse the path introduces an increased amount of dielectric separation.

88. **(Original)** The method of claim 87, wherein the increased amount of dielectric separation is caused by an introduction of a dielectric material within a perimeter of the path.

89. **(Original)** The method of claim 87, wherein the path traversed is substantially a curve and forcing the arcing to follow the path along the curve introduces the increased amount of dielectric separation.

90. **(Original)** The method of claim 69, wherein the heat generated causes a meltdown of at least a portion of the fuse element.

91. **(Original)** The method of claim 90, wherein the meltdown causes creation of the gap.

REMARKS

This paper is responsive to the Advisory Action dated August 15, 2003, having a shortened statutory period set to expire on September 4, 2003 in which,

Claims 1-19, 21-35, 37-70 and 73-91 were pending; and

Claims 1-19, 21-35, 37-70 and 73-91 were rejected.

No claims have been added or canceled in the present response. Claims 1, 33, 37, 38, 69, and 73-75 have been amended. Accordingly, claims 1-19, 21-35, 37-70 and 73-91 remain currently pending in the present application.

Rejection of Claims under 35 U.S.C. §102

In the present Office Action, claims 49, 59-70, 73-78, and 87-91 were rejected under 35 U.S.C. §102(b) as being anticipated by United States Patent No. 4,441,093 issued to Okazaki. (hereinafter, "*Okazaki*"). While not conceding that any of the Examiner's cited references qualify as prior art, but instead to expedite prosecution, Applicants have chosen to traverse the Examiner's rejections as follows. The following arguments are made without prejudice to Applicants' right to establish, for example in a continuing application, that one or more of the cited references do not qualify as prior art with respect to an invention embodiment currently or subsequently claimed.

With respect to Applicants' claim 49, the present Office Action states that,

Okazaki discloses a fuse assembly (Fig. 5, 6) comprising: a fuse element (12) prepared in a substantially non-linear form, the fuse element comprising at least two terminals (11), the at least two terminals (11) comprising a first terminal and a second terminal; and a fuse body comprising a dielectric material (14, 15) adapted to substantially enclose the fuse element (12) between the at least two end terminals (11), and means (a portion (15) of said dielectric material (14, 15)) for increasing dielectric separation to impede the arcing (inherently), wherein said means (15) for increasing said dielectric separation is separated from said fuse element (12) by a space (accommodating the portion (14) of the dielectric material) along a length of said fuse element (12).

Applicants respectfully disagree. Applicants respectfully submit that claim 49 (previously presented) recites,

A fuse comprising:

a fuse element prepared in a substantially non-linear form, wherein at least a portion of the fuse element is capable of experiencing arcing as a result of excessive current flowing through the fuse element;
means for increasing a dielectric separation to impede the arcing, wherein said means for increasing said dielectric separation is separated from said fuse element by a space along a length of said fuse element.

and fails to recite, a fuse element “comprising at least two terminals (11), the at least two terminals (11) comprising a first terminal and a second terminal; and a fuse body comprising a dielectric material (14, 15) adapted to substantially enclose the fuse element (12) between the at least two end terminals (11)” as indicated by the Examiner.

Moreover, Applicants respectfully submit that *Okazaki* fails to teach, show, or suggest, “means for increasing a dielectric separation to impede the arcing” as required by Applicants’ claim 49 and generally required by Applicants’ claim 69. Particularly where the described means is construed to cover the corresponding structure, material, or acts described in Applicants’ specification and reasonable equivalents thereof.

Okazaki teaches a thermal fuse which comprises a coiled spring interposed in a stretched condition between two opposed conductors in such a fashion that the spring is imparted with tension and is soldered by a fusible alloy having a specified fusing point. According to the teaching *Okazaki* the coiled spring is cut at one portion so that a circuit between the two conductors is broken upon fusing of the fusible alloy due to the action of the coiled spring. (*Okazaki*, Abstract) While *Okazaki* discusses the speed with which disconnection via the fuse occurs, weather and moisture resistance (see *Okazaki* Column 1, Lines 15-17), and the prevention of the physical reconnection of fuse conductors (see *Okazaki* Column 3, Lines 8-16), Applicants can find nothing within *Okazaki* which references arcing or “means for increasing a dielectric separation” to impede arcing as claimed by Applicants.

Figure 5 of *Okazaki* shows an embodiment in which a coiled spring bent into a U-shape is interposed between two conductors in parallel such that, “the spring is imparted

with elasticity which is necessary for opening the circuit.” (*Okazaki*, Column 2, Lines 60-61) and that, coupled with a thermoplastic synthetic resin layer, “there is formed a hollow of such a size that the cut two coiled spring portions and the conductors in parallel are prevented from re-connection due to melting of the thermoplastic synthetic resin layer.” (*Okazaki*, Column 3, Lines 12-16) The embodiment of Figure 5 of *Okazaki* is therefore distinguished from the embodiments of Figures 1-4 in which “fused” or melted fusible metal may contact and re-connect the conductors after the circuit therebetween is initially broken.

Applicants respectfully submit that no cited portion of the Examiner’s cited reference teaches, “means for increasing a dielectric separation to impede the arcing” as required by Applicants’ claims. Applicants therefore respectfully submit that claims 49 and 69, and all claims depending therefrom, are allowable over the Examiner’s cited reference *Okazaki*.

Rejection of Claims under 35 U.S.C. §103

Claims 1-19, 21-35, 37-48, 50-58 and 71-86 were rejected under 35 U.S.C. §103(a) as being unpatentable over *Okazaki* in view of United States Patent No. 5,572,181 issued to Kiryu et al. (hereinafter, *Kiryu*). While not conceding that any of the Examiner’s cited references qualify as prior art, but instead to expedite prosecution, Applicants have chosen to traverse the Examiner’s rejections as follows.

With respect to Applicants’ claim 1 the present Office Action states that,

Okazaki disclosed a fuse assembly (Fig. 5, 6) comprising: a fuse element (12) prepared in a substantially non-linear form, the fuse element comprising at least two terminals (11), the at least two terminals (11) comprising a first terminal and a second terminal; and a fuse body comprising a dielectric material (14, 15) adapted to substantially enclose the fuse element (12) between the at least two end terminals (11), wherein at least a portion (15) of the dielectric material (14, 15) is positioned between an area bounded by said fuse element (12) in a substantially non-linear form and a line connecting two ends of the fuse element (12), and the fuse element (12) is separated from said portion of the dielectric material (15) by a space (accommodating a portion (14) of the dielectric material) along a length of said fuse element (12), but did not disclose that said end terminals (11) are connected to the endcaps.

Kiryu disclosed a fuse assembly (Fig. 3), wherein a fuse element (3) is connected to the two end caps (2) for the purpose of the convenient installation in a power distribution conductor on a circuit board (column 6, lines 48+).

The present Office Action further states that,

It would have been obvious to a person of ordinary skill in the fuse art at the time of the invention to provide said fuse assembly of Okazaki with the end caps as taught by Kiryu in order to adapt said fuse assembly of Okazaki for a convenient installation in a power distribution conductor on a circuit board.

Applicants respectfully disagree. Applicants submit that the Examiner has failed to provide sufficient suggestion or motivation for the combination of *Okazaki* and *Kiryu*. Applicants note that it is impermissible within the framework of 35 U.S.C. §103 to pick and choose from any one reference only so much of it as will support a given position to the exclusion of other parts necessary to the full appreciation of what the reference fairly suggests to one of ordinary skill in the art and further that the Examiner may not use the claimed invention as an instruction manual or template to piece together the teachings of the prior art so that the claimed invention is rendered obvious.

Moreover, as discussed herein with respect to Applicants' claims 49 and 69, Applicants respectfully submit that neither of the Examiner's cited references teach, show, or suggest, "a fuse body comprising a dielectric material...wherein at least a portion of the dielectric material is positioned...to impede arcing across the fuse element" as required by Applicants' claim 1 and generally required by Applicants' claim 33. Applicants therefore submit that claims 1 and 33, and all claims depending therefrom, are allowable over the Examiner's cited references *Okazaki* and *Kiryu*.

With respect to Applicants' claim 18 the present Office Action states that, "...the method steps recited in the claims are inherently necessitated by the device structure as disclosed by Okazaki in view of Kiryu." Applicants respectfully disagree. As an initial matter, Applicants note that no "steps" are recited within claim 18. Applicants further submit that neither *Okazaki* nor *Kiryu* teach, show, or suggest, "adjusting distance between the first terminal and the second terminal" to reduce a fuse element footprint as claimed (Applicants' claim 18) Applicants therefore respectfully submit that claim 18,

and all claims depending therefrom, are allowable over the Examiner's cited references *Okazaki* and *Kiryu*.

CONCLUSION

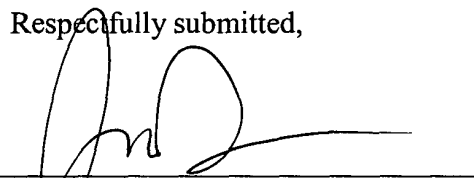
In view of the amendments and remarks set forth herein, the application is believed to be in condition for allowance and a notice to that effect is solicited. Nonetheless, should any issues remain that might be subject to resolution through a telephonic interview, the Examiner is invited to telephone the undersigned at 512-439-5097.

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Respectfully submitted,



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